

# ADVANCED REACTOR, FUEL CYCLE, AND ENERGY PRODUCTS WORKSHOP FOR UNIVERSITIES

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***Gen IV/AFCI/GNEP***

***Sodium Fast Reactor/Advanced Burner Reactor***

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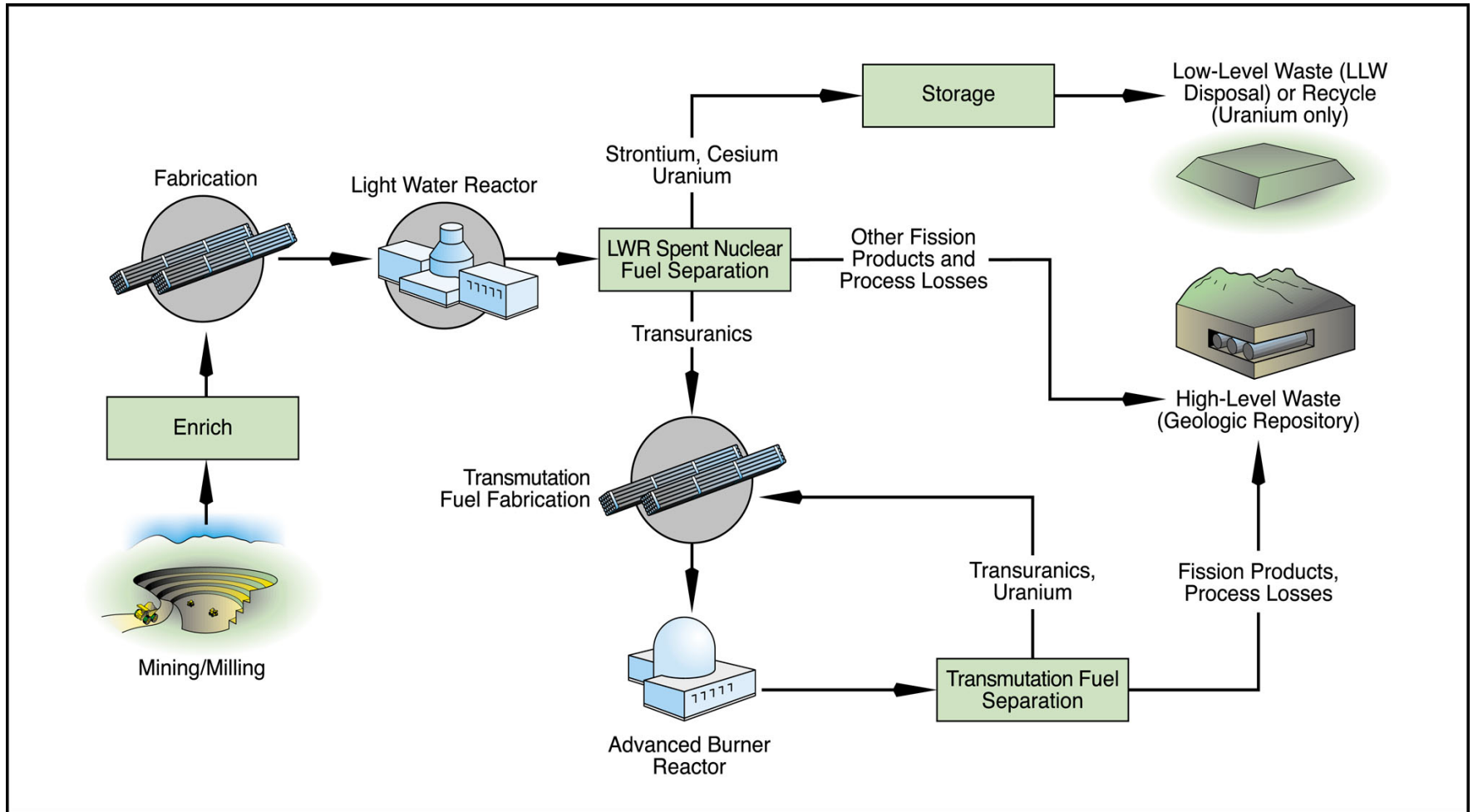
***Workshop for Universities  
Hilton Hotel, Gaithersburg, MD  
March 20, 2007***



## **Overall Work Scope**

- **Technology developments in support of Sodium Fast Reactor (SFR) elements of the Generation IV and AFCI/GNEP programs**
- **Building on the foundation laid by previous reactor development programs; apply modern technology advances to design, construction, and operation**
- **Develop SFR concepts and features to maximize performance, to improve economics, and to enhance safety and security**

# GNEP Reference Strategy



# **Advanced Burner Reactor – R&D Needs**

- **Both technology and simulation R&D to improve performance**
- **Primary issues that may inhibit sodium-cooled fast reactors are**
  - **Perception of higher capital costs**
  - **Unique concerns related to liquid metal coolant**
- **Innovative design features for cost reduction**
  - **Configuration simplifications**
  - **Improved inspection and maintenance equipment**
  - **Advanced energy conversion systems**
  - **Advanced structural materials**
- **Reactor safety demonstration**
  - **Assurance of passive safety behavior**
  - **Licensing consideration of severe accidents**
- **Closed fuel cycle demonstration**
  - **Fuel behavior**
  - **Remote fabrication of recycle fuels**

# **FY06 ACCOMPLISHMENTS**

- **Generation IV International Forum (GIF): SFR Systems Arrangement document signed by U.S., France, Japan, and Korea**
  - **Development of a Systems Research Plan and Project Arrangements as a mechanism for defining specific R&D activities**
- **AFCI/GNEP: Definition of overall GNEP program structure and role for SFR technology as the advanced burner reactor (ABR) prototype**
  - **Pre-conceptual scoping investigations of ABR prototype configuration and performance potential for satisfaction of mission goals**

## **WORK IN PROGRESS FOR FY07**

- **GIF: Discussions toward resolution of national SFR priorities and programs with global fuel cycle proposals**
- **GNEP: DOE and contractor activities to support facility site selection, technology preservation and availability for industrial partners**
  - **Programmatic environmental impact statement (PEIS)**
  - **Facility sites study awards (11 sites)**
  - **Expressions of interest from industry**
  - **Assessment of SFR technology status; identification of technology needs**

# **PLANS FOR FY08-09**

- **Harmonization of GIF and GNEP SFR activities**
- **Support to industry for prototype ABR design**
  - **Development of prototype ABR requirements and specifications; support design activities**
  - **Complete technology gap assessment; resolve gaps**
  - **Initiate start-up fuel qualification**
  - **Modern design features: fuel handling, ISI, I&C**
- **Begin trade studies for longer-term commercial deployment; economics, reliability, performance**
  - **Commodity reduction, design simplification, materials**
  - **Transmutation fuel development**